compared to a single jet. Each of the lances may be provided with means for emitting a plurality of jets of oxygen containing gas from its end portion.

The lances are preferably configured with at least one of the lances projecting through the roof portion of the metallurgical vessel. The roof portion of the vessel extends from the top of the sidewall. If a melting cyclone is positioned above and in open communication with the vessel then the roof portion extends from the top of the sidewall to the melting cyclone. At least one of the lances thus penetrates through part of the vessel that does not come into contact with the contents of the vessel thereby avoiding damage to the seal around the lance at the point it penetrates the vessel. Each of the lances may project through a roof portion of the metallurgical vessel.

At least one lance is preferably arranged to direct the oxygen containing gas inwards towards the central axis of the metallurgical vessel. Each of the lances may be arranged to direct the oxygen containing gas inwards towards the central axis of the metallurgical vessel. Directing the gas inwards towards the central axis of the vessel creates an area of low pressure at the lance end portion resulting in post combusted gas being entrained downward at the sidewall towards the end portion of the lance whilst an upward flow of post combusted gas is generated up through the centre of the vessel.

At least one of the lances may be inclined from the vertical with its end portion inclined towards the central axis of the metallurgical vessel. Inclining a lance directs the oxygen containing gas inwards towards the central axis of the metallurgical vessel and improves the distribution of oxygen containing gas over the surface of the contents of the vessel. Each of the lances may be inclined from the vertical with its end portion inclined towards the central axis of the metallurgical vessel.

The end portion of at least one lance may also be configured to direct the oxygen containing gas towards the central axis of the metallurgical vessel at a greater angle from the vertical than the angle of inclination of the lance thereby increasing the upward and downward gas flow generated in the vessel. Each of the lances may be configured to direct the oxygen containing gas towards the central axis of the metallurgical vessel at a greater angle from the vertical than the angle of inclination of the lance.

The lances may be adjustable in height and therefore able to be positioned at an optimal height over the surface of the of the vessel contents when the vessel is at varying levels of fullness. The angle of inclination of the lances may also be adjustable to enable the distribution of oxygen containing gas over the surface of the contents of the vessel to be optimised.

The lance end portions may all be positioned at an equal distance from the sidewall to achieve the most effective heat distribution over the surface of the vessel contents to maximise production efficiency. Preferably three or more lances supply oxygen containing gas to the contents of the vessel to ensure optimum heat distribution and production efficiency.

Particulate material may preferably be added to the metallurgical vessel via feed chutes positioned at a short distance from the lances. The substantially downward gas flow in the vicinity of the sidewall thus entrains the particulate material in the form of e.g. coal fines and

11. Metallurgical vessel according to claim 9 wherein each lance has a corresponding feed chute.

12. Metallurgical vessel according to claim 11 wherein each feed chute is positioned between the lance and the sidewall of the metallurgical vessel in a radial direction.

13. Metallurgical vessel according to any of the preceding claims wherein the sidewall comprises a lower portion for accommodating a molten metal bath and a slag layer and an upper portion for accommodating a slag layer and wherein the at least two lances for supplying oxygen containing gas to the upper portion of the vessel project into the upper portion of the vessel and wherein a plurality of tuyeres for supplying gas and/or liquid and/or solids and/or plasma into the slag layer in the lower portion of the vessel are arranged around the circumference of the lower portion of the vessel.

14. Metallurgical vessel according to claim 13 wherein the diameter of the lower portion of the vessel is smaller than that of the upper portion.

15. Metallurgical vessel according to claims 13 or 14 characterised in that the tuyeres comprise oxy-fuel burners.

16. Metallurgical vessel according to any one of claims 1 to 15 comprising a melting cyclone positioned above and in open connection with the metallurgical vessel.

17. Metallurgical vessel according to claim 16 wherein the lances are positioned to avoid contact with molten material passing downwards from the melting cyclone to the metallurgical vessel.

18. Method of reducing iron oxides into iron using a metallurgical vessel in accordance with any one of claims 1-12 comprising the steps of supplying iron oxides to the vessel and reducing the iron oxides by supplying carbonaceous material to the vessel and supplying oxygen containing gas to the iron oxides via the lances.

19. Method of reducing iron oxide to iron using a metallurgical vessel in accordance with any one of claims 13-17, comprising the steps of supplying iron oxide to the vessel, supplying oxygen containing gas to the upper portion of the metallurgical vessel via the lances, supplying carbonaceous material to the iron oxide and supplying gas and/or liquid and/or solids and/or plasma into the slag layer in the lower portion of the vessel via the plurality of tuyeres.

20. Method of reducing iron oxide according to claim 19 characterised in that the tuyeres supply oxygen containing gas into the lower slag layer.

21. Method of iron making comprising the steps of:
- conveying iron oxide or pre-reduced iron oxide into a metallurgical vessel
- supplying oxygen containing gas to the metallurgical vessel via a lance arrangement of at least two lances configured so as to achieve in operation a substantially downwardly directed flow of post-combusted gases at the side wall of the vessel and a substantially upwardly directed flow of post-combusted gases in the centre of the vessel,
- supplying carbonaceous material to the vessel.

22. Method according to claim 1 comprising the steps of:
- conveying iron-oxide containing material into a melting cyclone,
- pre-reducing said iron-oxide containing material by means of reducing post combusted gases originating from the metallurgical vessel,
- at least partly melting the iron-oxide containing material in the melting cyclone by supplying oxygen containing gas to the melting cyclone and effecting a further post combustion in said reducing post combusted gases,
- permitting the pre-reduced and at least partly melted iron-oxide containing material to pass downwardly from said melting cyclone into the metallurgical vessel in which final reduction takes place and
- effecting the final reduction in the metallurgical vessel in a slag layer by supplying oxygen containing gas to the metallurgical vessel, via the lances, and supplying coal to the metallurgical vessel and thereby forming a reducing gas and effecting at least partial post combustion in said reducing gas in said metallurgical vessel by means of said oxygen containing gas supplied thereto.

23. Method of iron making according to claim 21 or 22 comprising the step of:
- supplying gas and/or liquid and/or solids and/or plasma into a slag layer in a lower portion of the vessel.